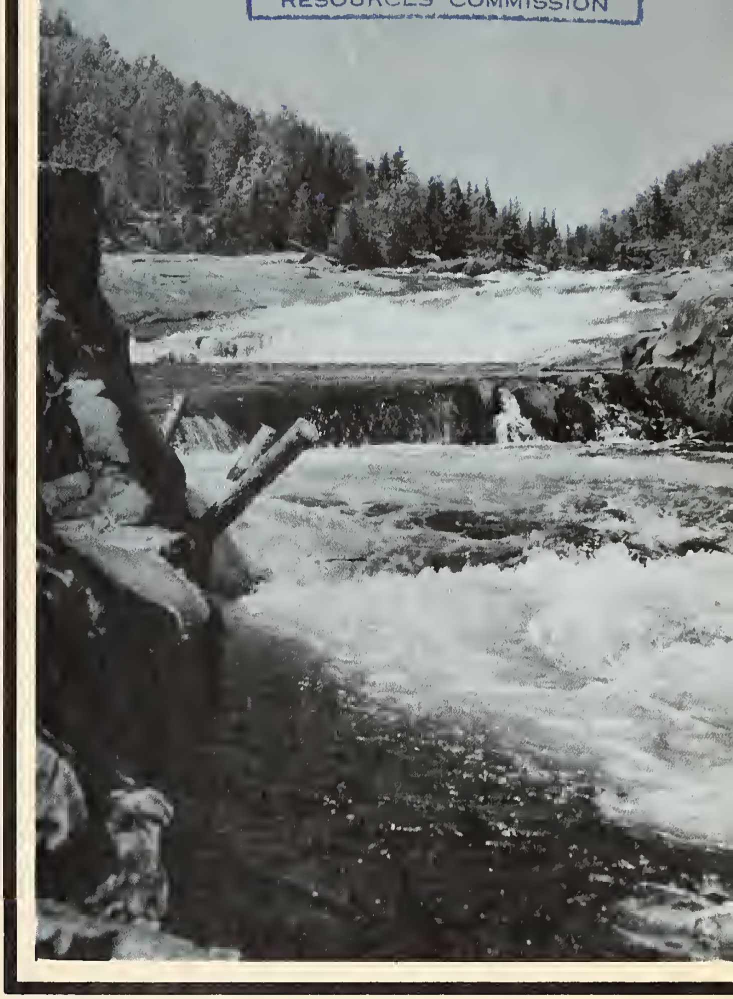
ONTARIO MINISTRY OF ENVIRONMENT
36936000024479

LIBRARY COPY
JUN 21 1965
ONTARIO WATER
RESOURCES COMMISSION

Owen Sound Sewage Treatment Plant



1963 Annual Report

TD
367
.A56
O94
1963
MOE

Ontario Water Resources Commission

TD
367
.A56
O94
1963

Owen Sound : sewage
treatment plant.

81786

ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Mayor and Members of Council,
City of Owen Sound.

Gentlemen:

I am pleased to submit, for your information, the 1963 Annual Operating Report of the Owen Sound Sewage Treatment Plant, OWRC Project No. 60-S-68, which has been prepared by our Division of Plant Operations.

We are grateful for the kind cooperation which you and your staff have extended to our Operations staff throughout the year. We look forward to a continuing close association with you in our mutual endeavour to control pollution.

Yours very truly,

D S Caverly

D. S. Caverly,
General Manager

Digitized by the Internet Archive
in 2015

https://archive.org/details/owensoundsewaget24479

General Manager,
Ontario Water Resources Commission.

Dear Sir:

It is with pleasure that I present to you the Annual Report of the operation of the Owen Sound Sewage Treatment Plant, OWRC Project No. 60-S-68 for 1963.

This report presents design data, outlines operating problems encountered and summarizes in tables, charts and graphs all significant flow and cost data.

Yours very truly,

B C Palmer

B. C. Palmer,
Director,
Division of Plant Operations

foreword

This report is designed to present the highlights of the operation of these works during 1963. Trends in flows and other operating data can be extremely useful in the development of necessary long range enlargement and improvement programs.

In addition to the activities reported herein, much unrecorded effort has contributed to the success of this operation. The municipality, through representatives on the Local Advisory Committee, has given valuable assistance in reviewing salary schedules, detailed operating budgets, personnel problems, flow patterns, and major maintenance problems.

The Division of Plant Operations has provided direction to the field staff in administrative procedures, quality control, maintenance schedules, equipment inspection and purchase supervision. A number of other Divisions of the Commission have been of service. The Division of Construction has offered helpful advice on equipment selection and renovation problems. The Division of Sanitary Engineering has maintained, through its District Engineering staff, a keen interest in the operation and has made a number of constructive recommendations. Its operator training courses have been very helpful. The Division of Finance has processed many payrolls, purchase orders and invoices dealing directly with this project. The Commission Personnel Director has been most helpful in the selection of new staff.

The excellent cooperation of all of these groups is gratefully acknowledged.

BC Palmer

B. C. Palmer,
Director,
Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION

DIVISION OF PLANT OPERATIONS

contents

Foreword................Page 1

Title Page................Page 2

History..................Page 3

Project Staff.............Page 4

Description of Project.....Page 5

Design Data..............Page 7

Plant Flow Chart.........Page 9

Process Data.............Page 10

Operating Costs..........Page 17

Summary.................Page 19

Total Costs.......Inside back cover

C. W. Perry
Assistant Director
A. C. Beattie
Regional Supervisor
A. Clark
Operations Engineer

OWEN SOUND SEWAGE TREATMENT PLANT

OPERATED FOR

THE CITY OF OWEN SOUND

BY

THE ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN

A. M. Snider

COMMISSIONERS

W. D. Conklin, Q. C.

J. H. H. Root, M.P.P.

J. A. Vance, LL. D.

A. A. Wishart, Q. C.

GENERAL MANAGER

D. S. Caverly

ASSISTANT GENERAL MANAGERS

G. M. Galimbert
L. E. Owers

COMMISSION SECRETARY

W. S. MacDonnell

1960 to 1963 History

INCEPTION

In 1960, the City of Owen Sound and the Ontario Water Resources Commission initiated plans for the construction of a modern water pollution control plant. The firm of Gore & Storrie, Toronto, Ontario, was engaged to prepare plans and specifications for the project.

APPROVAL

On October 27th, 1961, the municipality signed an agreement with the Ontario Water Resources Commission to finance, construct and operate a water pollution control plant.

CONSTRUCTION

Schwenger Construction Company Limited - Burlington, Ontario was awarded the contract. Construction was completed on December 21st, 1962.

TOTAL COST

The total cost of the project was $662,428.23.

Project Staff

Norris Morley,

Chief Operator

Mr. Norris Morley joined the Ontario Water Resources Commission in October 1962 as the Chief Operator of the plant.

The other members of the staff are:

D. M. Coates - Operator

J. D. McKay - Operator

Description of Project

INFLUENT WORKS

The waste water enters the plant through a 39" diameter sewer, passing into the influent chamber of the pumping station wet well. The chamber is equipped with a bar screen to remove large objects from the sewage.

From here, the flow is pumped through a comminuting device which screens and shreds the larger particles to a size suitable for handling in the treatment units.

The flow then discharges to the aerated grit chamber where the velocity of flow is reduced sufficiently to allow grit and detritus material, which may damage plant machinery, to settle out. The air introduced in the chamber produces a roll which allows grit to settle out, while keeping the organic material in suspension. Grit is removed manually.

From this point, the flow discharges to the primary tanks.

PRIMARY SEDIMENTATION

The two rectangular tanks are designed to provide an adequate detention period to allow the heavier solids to settle out, and for removal of surface scum and grease.

The tanks are divided into two sections and equipped with longitudinal sludge collectors which serve as skimming mechanisms for removal of surface material and for transferring the settled sludge to hoppers located at the end of the tanks. The sludge hoppers are equipped with cross collector mechanisms which draw the sludge to a central point. The sludge and the surface material is drawn off and pumped to the primary digester.

The primary tanks are designed to provide a detention period, sufficient to allow removal of approximately 35-40% of the heavy organic material.

The settled waste water flows over the effluent weirs and discharges into the chlorine contact chamber.

CHLORINATION

The chlorinator is capable of injecting up to 2,000 pounds per day of chlorine into the final effluent to reduce the bacteria count to acceptable limits.

DIGESTION

Sludge digestion in this plant is performed in two stages called primary and secondary digestion.

The sludge from the primary tanks is pumped to the primary digester. In the absence of air, and in a regulated temperature of 90 degrees Fahrenheit, the decomposing or digestion process begins. Constant agitation within the tank ensures overall treatment.

The raw sludge is broken down by anaerobic bacterial action and, when thoroughly digested, is a thick, black, odourless liquid.

The secondary digester receives the digested material from the primary and completes the process. The secondary digester is not agitated, but is allowed to be quiescent. The supernatant is decanted and returned to the treatment process.

Sludge gas (princially methane), formed during the process, is used as a fuel for the heat exchangers and boiler, supplying heat to the digesters and buildings. The standby fuel is oil.

Design—Data

GENERAL

Type of Plant - Primary treatment.

Design Population - 25,000 persons.

Design Plant Flow - 3.0 million Imperial gallons per day (MGD).

Per Capita Flow - 120 gallons per day.

Five Day BOD

Raw Sewage	180 PPM, or 5400 lbs. of BOD per day.
Removal	40%

Suspended Solids

Raw Sewage	200 PPM, or 5000 lbs. of S.S. per day.
Removal	65%

SEWAGE PUMPING STATION

This station is in the administration building. A 39" diameter sewer enters into the wet well through a coarse bar screen. The bar openings are 1 3/4" clear. There is provision of bypassing the pumping direct to the Sound.

The pump capacities are:

One pump - 3150 GPM - TDH of 33 ft. at 1150 rpm electric motors with diesel standby.

Two pumps - 3150 GPM each - TDH of 33 ft. at 1150 rpm electric motors with wound rotors for variable speed drive.

Total pump capacity is 9.0 MGD.

SCREENING

Three parallel channels, one equipped with a Model C, 36" barminutor, the others with bar screens.

AERATED GRIT TANK

Dimensions - 18'-6" x 13' x 12'.

Volume - 2,890 cubic ft. or 18,000 gallons.

Detention Period - 3.0 MGD - 8.6 minutes.

Detention Period - 9.0 MGD - 2.9 minutes.

PRE-AERATION TANK

Dimensions - 23'-9" x 13' x 12.13'.

Volume - 3,750 cubic ft. - 23,400 gallons.

Detention Period - 3.0 MGD - 11.2 minutes.

PRIMARY SETTLING TANKS

Two tanks.

Dimensions - 78' x 32' x 12'6".

Volume (total) - 62,400 cubic ft. or 388,000 gallons.

Detention Period - 3.0 MGD - 3.11 hours.

Surface Settling Rate - 600 gallons per sq. ft. of tank per day.

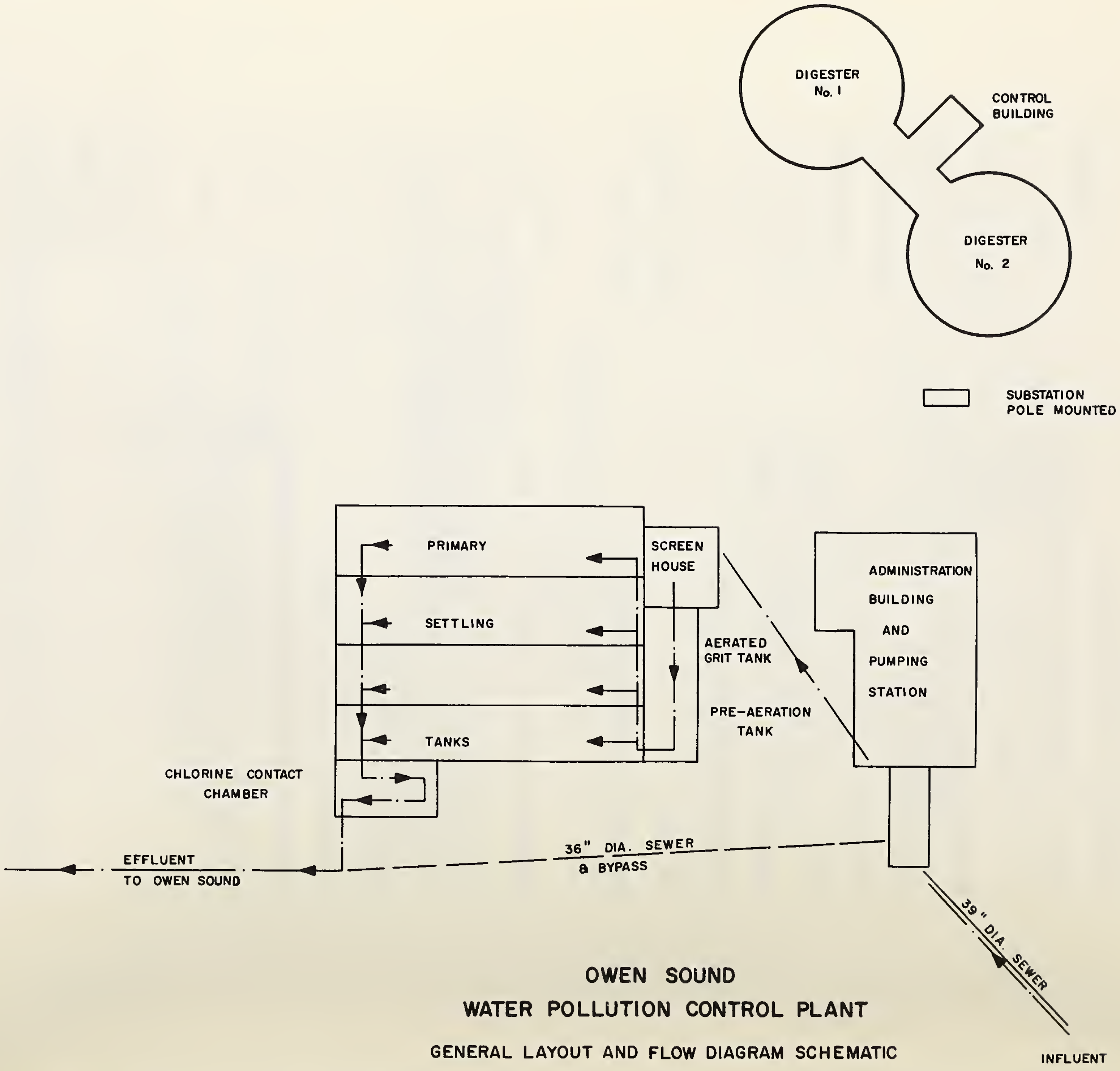
Weir Overflow Rate - 8,260 gallons per lineal ft. of weir per day.

Chlorine Contact Chamber

Dimensions - 31' x 14' x 8' deep.

Volume - 3,480 cubic ft. or 21,700 gallons.

Retention Time - 11.2 minutes at design flow.

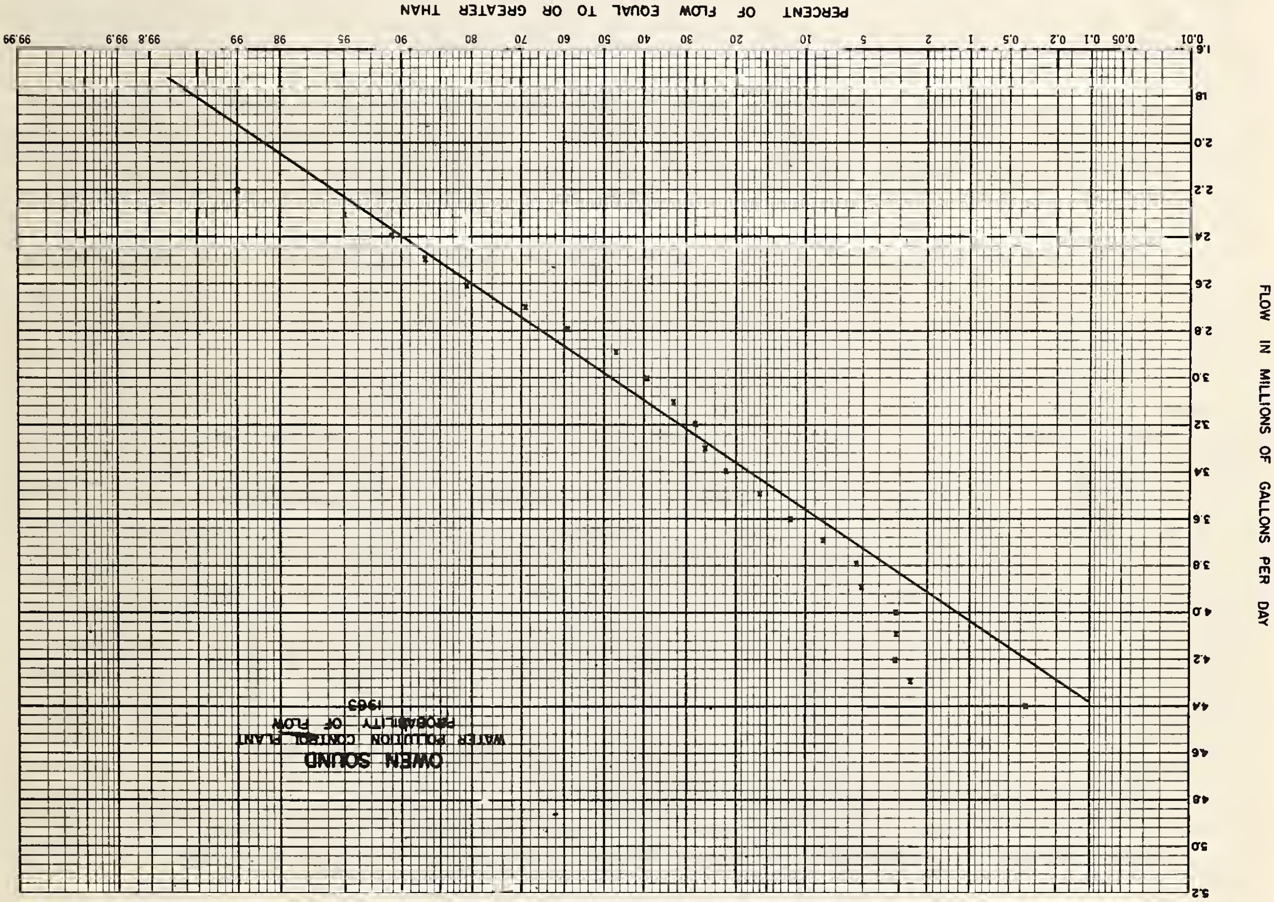


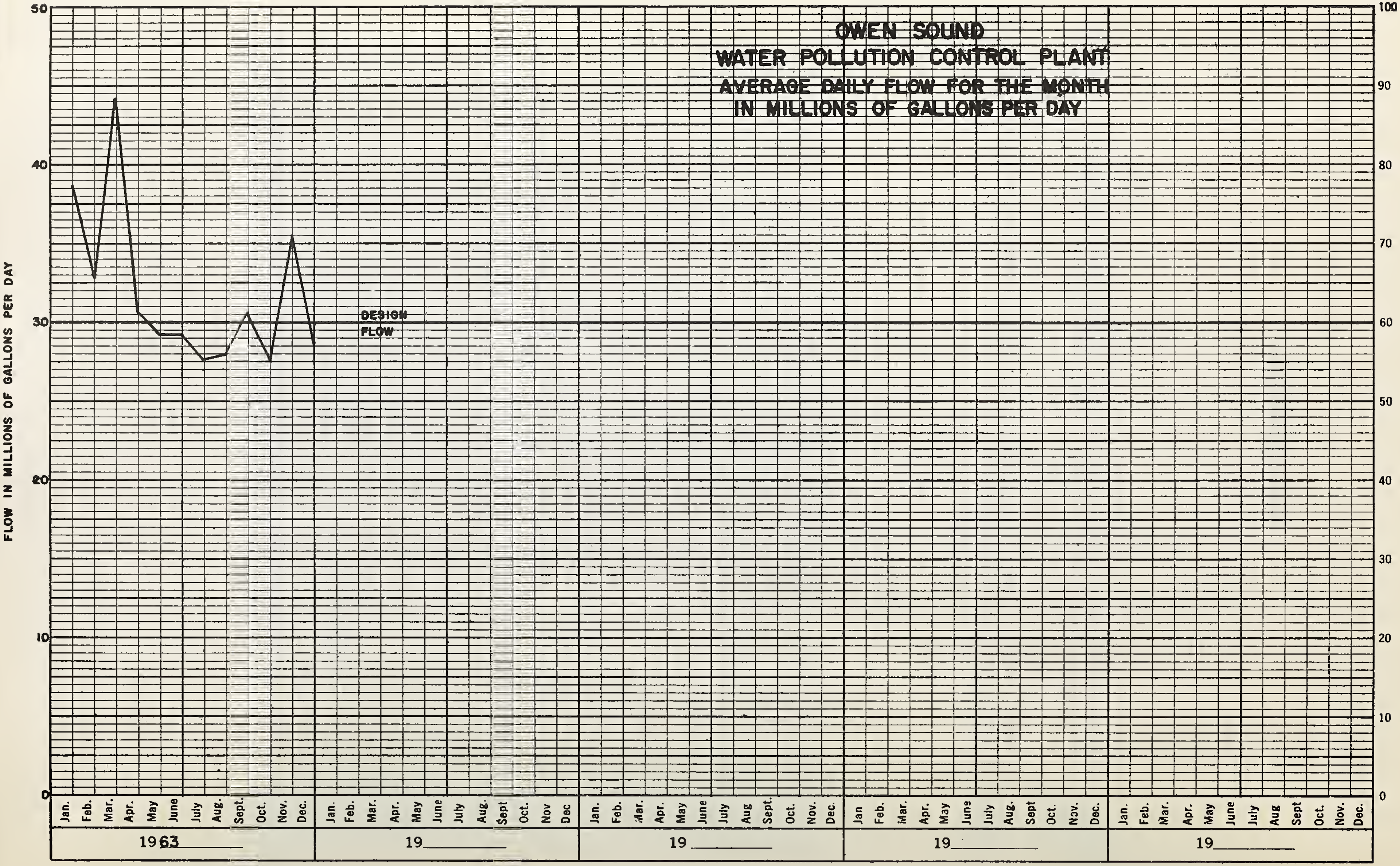
OWEN SOUND
WATER POLLUTION CONTROL PLANT
GENERAL LAYOUT AND FLOW DIAGRAM SCHEMATIC

Process Data

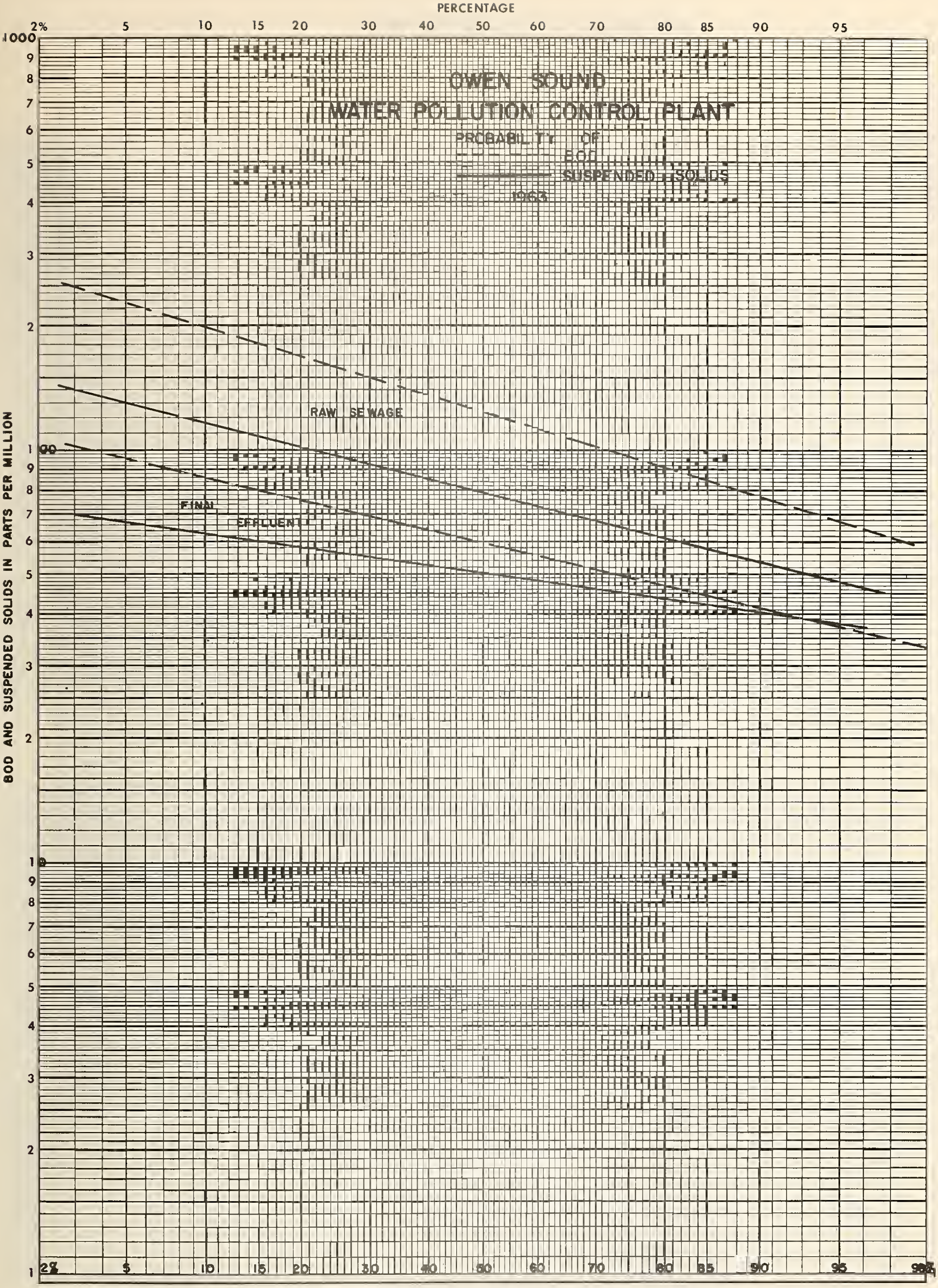
The flow data for this curve was available for only 10 months of the year. This is due to metering repairs during May and June. The flows have been estimated by interpolation.

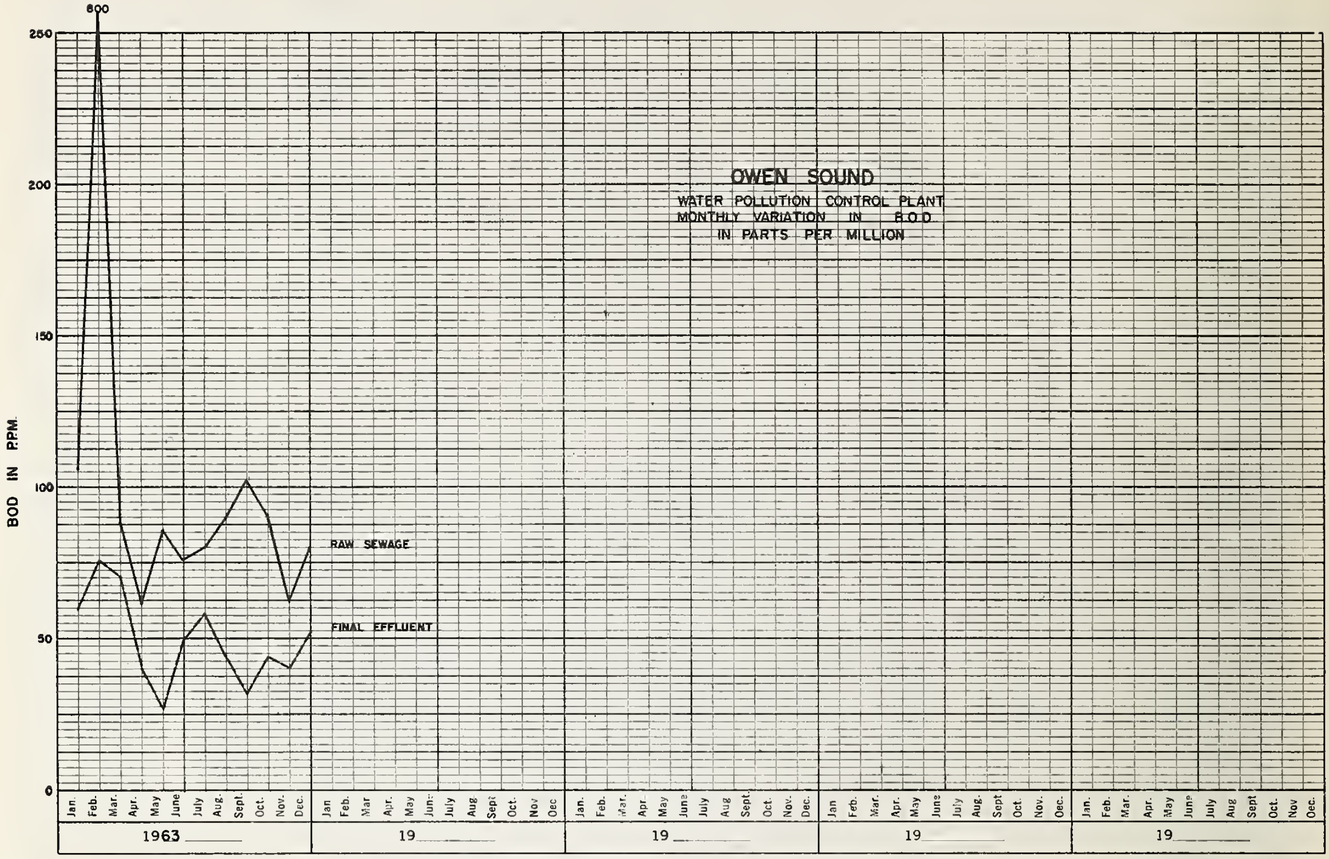
It will be noted that 50 percent of the time the flow is 3.0 million gallons per day and that this is the design flow of the plant.

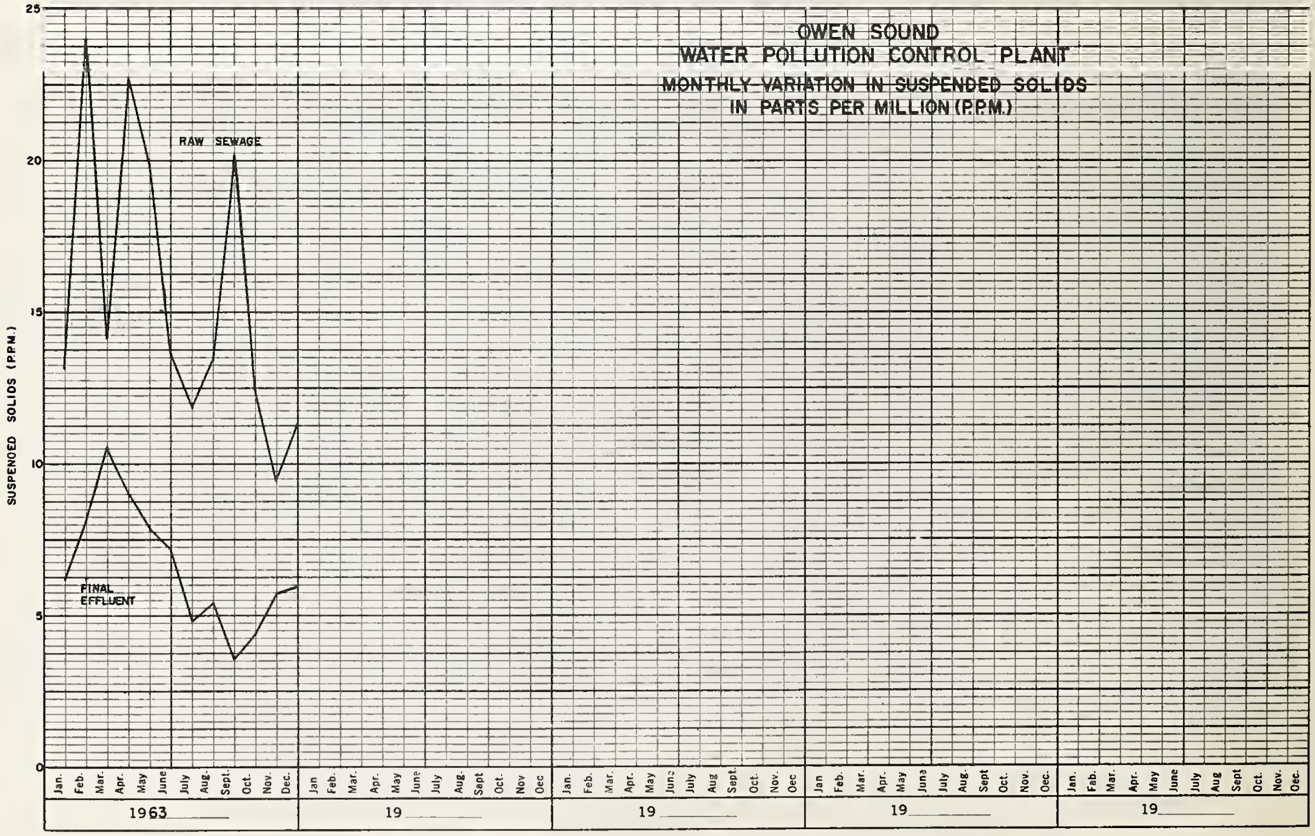




OWEN SOUND
WATER POLLUTION CONTROL PLANT
AVERAGE DAILY FLOW FOR THE MONTH
IN MILLIONS OF GALLONS PER DAY


OWEN SOUND
WATER POLLUTION CONTROL PLANT
PROBABILITY OF
BOD
SUSPENDED SOLIDS
1963
RAW SEWAGE
FINAL
EFFLUENT
PERCENTAGE
2% 5 10 15 20 30 40 50 60 70 80 85 90 95
BOD AND SUSPENDED SOLIDS IN PARTS PER MILLION
1000 9 8 7 6 5 4 3 2 100 9 8 7 6 5 4 3 2 10 9 8 7 6 5 4 3 2 1
2% 5 10 15 20 30 40 50 60 70 80 85 90 95 98%


OWEN SOUND
WATER POLLUTION CONTROL PLANT
MONTHLY VARIATION IN B.O.D.
IN PARTS PER MILLION
BOD IN P.P.M.
600
250
200
150
100
50
0
RAW SEWAGE
FINAL EFFLUENT
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1963
19


OWEN SOUND
WATER POLLUTION CONTROL PLANT
MONTHLY VARIATION IN SUSPENDED SOLIDS
IN PARTS PER MILLION (P.P.M.)
SUSPENDED SOLIDS (P.P.M.)
25
20
15
10
5
0
RAW SEWAGE
FINAL EFFLUENT
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1963
19

GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	106	59	44.5	28.1	132	62	53.0	41.9	28.0
FEB.	800	76	90.5	333.6	240	81	66.0	73.3	8.2
MAR.	88	70	20.5	12.3	142	106	25.5	24.6	91.2
APR.	62	40	35.5	10.1	227	90	60.5	62.9	24.0
MAY *	84	27	68.0	25.7	198	78	60.5	54.2	82.5
JUNE *	77	49	36.5	12.2	136	72	47.0	28.0	62.9
JULY	80	58	27.5	9.5	118	48	59.5	30.1	50.0
AUG.	90	44	51.0	20.0	134	54	59.5	34.7	94.4
SEPT.	102	32	68.5	32.2	202	36	82.0	76.2	152.3
OCT.	81	44	45.5	15.9	124	44	64.5	34.3	73.2
NOV.	63	40	36.5	12.3	94	57	39.5	19.7	107.0
DEC.	80	54	32.5	11.8	113	59	47.5	24.1	62.9
TOTAL				523.9				504.0	836.6
AVG.	143	49	46.4	43.6	155	66	55.4	42.0	69.7

* Flow meter out of service - figures prorated.

COMMENTS

The average BOD and suspended solids average of the raw sewage is about 40 PPM or 20% lower than the design.

The large volumes of grit are explained by the fact that there are combined sewers on the system.

DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			% VOL. MAT IN DIGESTED SLUDGE	GAS PRODUCED 1000'S CU. FT.	SLUDGE FROM DIGESTER 1000'S GALS
	1000'S GALLONS	SOLIDS (LBS. X 1,000)	VOL. MAT. (LBS. X 1,000)			
JAN.	80.5					
FEB.	135.0					
MAR.	574.1	1246	416			
APR.	118.8	55	38			
MAY.	282.0	313	122			
JUNE	225.0	450	173		281	
JULY	141.0	158	85		357	
AUG.	139.5	60	44		305	
SEPT.	50.0	30	13		324	
OCT.	214.0	231	144		307	
NOV.	184.0	192	96		366	
DEC.	248.0				225	
TOTAL	2391.9	2735	1131		2165	
AVG.	199.3	304	126		309	

COMMENTS

Since the digester came into operation, there has been ample production of good quality gas that has enabled the plant to operate without the expense of fuel oil. Although there are n figures to check volume reductions the amount of solids in the digested sludge is much highe than the raw, and the gas production is excellent indicating good operation.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS ** CHLORINE	DOSAGE RATE (P.P.M.)
JANUARY	119.598		
FEBRUARY	92.148		
MARCH	136.722		
APRIL	91.800		
MAY	* 90.427	2,000	2.22
JUNE	* 87.510	2,600	2.97
JULY	86.025	2,000	2.33
AUGUST	86.835	1,800	2.08
SEPTEMBER	91.857	3,800	4.18
OCTOBER	85.769	4,000	4.67
NOVEMBER	106.670	3,800	3.58
DECEMBER	89.082		
TOTAL	1164.493	20,000	22.03
AVERAGE	97.041	2,860	3.15

* Prorated
** Estimated

COMMENTS

Chlorination is practiced at the Owen Sound Sewage Treatment Plant for disinfection of the final effluent. Chlorination commences at the opening of the fishing season and continues to November 1st.

A residual of 0.5 PPM of chlorine is maintained to reduce the bacteria count in the final effluent.

1963

PLANT

Total Operating Costs*

MONTHLY

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	WATER
JAN	380			152	203		25				
FEB	3162	1848		641	296		177		8	178	15
MARCH	1773	924		434	260		94			37	24
APRIL	3270	924		299	370	1349	273			35	20
MAY	1692	834		174	428		123		11	102	20
JUNE	5310	657	153	190	408	3709	98			19	76
JULY	2385	1234	383	59	368		155	50	7	58	70
AUG	825	926	219		418	(900)	34			54	73
SEPT	1881	926	219	19	442		82	6		22	165
OCT	1755	926	109		442		82		39		156
NOV	1675	926	43		377		42	41	35	66	145
DEC	905	1525			376	(1350)	71	18	69	109	87
TOTAL	25012	11651	1127	1967	4388	2809	1256	115	137	713	850

* ALL FIGURES TAKEN TO NEAREST DOLLAR.

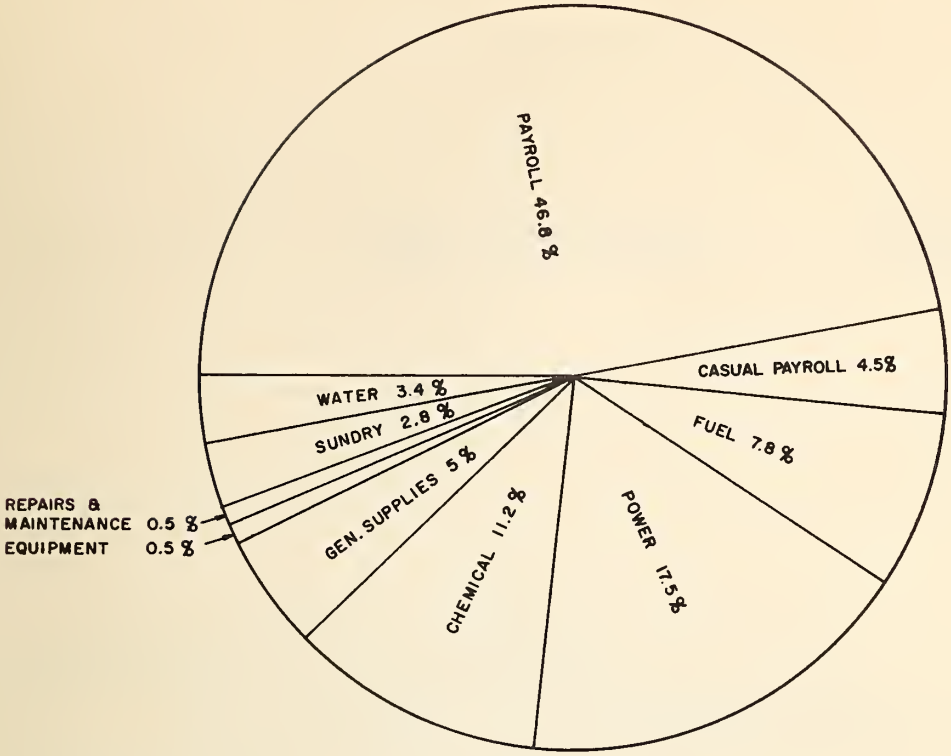
PLANT

YEARLY

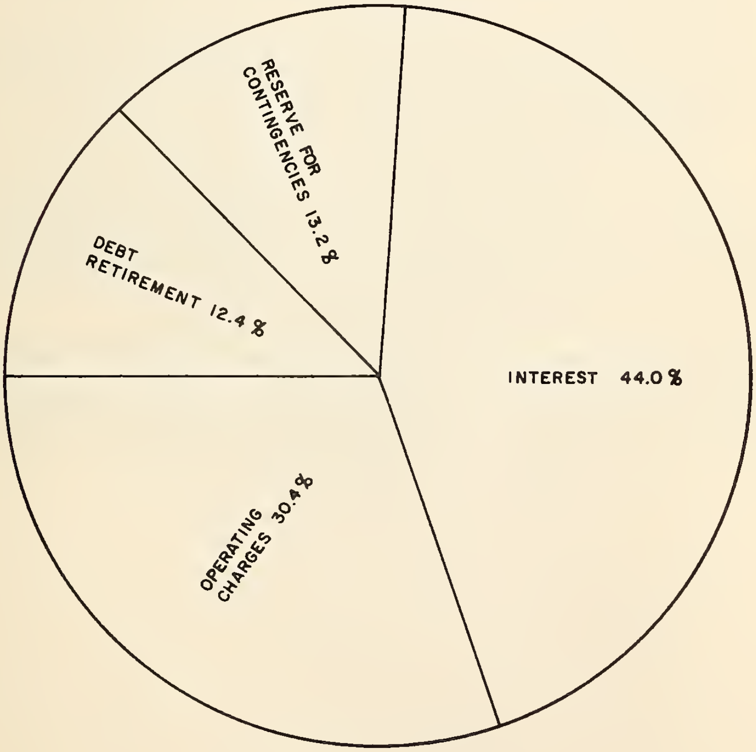
YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER CAPITA PER YEAR
1963	1164.493	$ 25,012.46	$ 21.50	$ 1.40

BASED ON A POPULATION OF 17,877.

1963 OPERATING COSTS



TOTAL ANNUAL COST



SUMMARY

This report has given some significant data on the operation of the Owen Sound Sewage Treatment Plant.

The average daily flow to the plant in 1963 was 3.18 million gallons per day. This flow is slightly higher than the average design flow of 3.0 million gallons per day. This is due to the town's combined sewers and the large storm flow.

The effluent being discharged into Owen Sound was satisfactory for a primary treatment plant. The average BOD removal was 46.4 percent and the average suspended solids removal was 55.4 percent.

The operating costs for the plant in 1963 were $25,012.46. The operating costs were very close to that of the budget, $30,000.00. The costs in 1964 will probably be greater due to a larger expenditure in maintenance and repair, and sludge hauling.

Under constant supervision by head office engineers, the plant staff has operated and maintained a clean, attractive and efficient plant in the City of Owen Sound. Special attention is given to good public relations and visitors are always welcome to inspect the facilities.

Total 1963 Costs

The total cost to the municipality during 1963 was as follows:

Debt Retirement	$ 10,175.00
Reserve for Contingencies	$ 10,729.00
Interest	$ 36,401.48
Operating Charges	$ 25,012.46
	$ 82,317.94

Note: The amount in the Reserve for Contingencies Account as of December 31st, 1963 was $ 10,953.94.

Division of Plant Operations

ONTARIO WATER RESOURCES COMMISSION

801 BAY ST. TORONTO 5